

Incorporating
"The
Illuminating
Engineer."

Light and Lighting

Official Journal
of the
Illuminating
Engineering
Society.

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London, S.W.1.

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Vol. XXXII.—No. 10

October, 1939

PRICE NINEPENCE
Subscription 10/6 per annum, post free

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Keep the Home Fires Burning

SO they sang in the last Great War. What exactly did this famous song mean?

Much more, surely, than is apparent on the surface. It meant that whilst the youth of the country was engaged in the soul-destroying business of warfare, it was the duty of those at home to preserve the things for which they were fighting—not only the material things that make for home comfort, but the imperishable qualities and traditions characteristic of our country, of which we all are conscious but which are so difficult to define.

Such things as culture and refinement, knowledge and sympathetic insight, good humour, good fellowship and a sense of proportion, we must preserve when and where we can.

Each one of us should seek to maintain our interest in the pursuit of knowledge—often a much more satisfying alternative to the stress of war than the search for enjoyment—even when some degree of risk may be involved. One cannot see, without some regret, the exodus of so many scientific bodies and educational institutions from the big cities to remote places of safety. It is encouraging, however, to note that the London County Council is recommencing evening classes.

For those in the thick of the conflict it is scarcely possible to look beyond the immediate effort, but others, whilst seconding their endeavours, can spare a thought to the preservation of things for time to come.



NOTES & NEWS ON



The President's Message

Members of the Illuminating Engineering Society will no doubt all have received the Message issued by the new President, Mr. F. C. Smith, which may be regarded as a temporary substitute for the address which would normally have been delivered at the opening meeting of the Session. It is part of the irony of fate that the address was expected to deal largely with the technical discussions at the meeting of the International Commission on Illumination, held in Holland last June, which was attended by representatives of many different nations, including those now at war, one with another. It was inevitable at the moment that meetings of the Society should be postponed. We can only hope that presently the position may become clearer and that some degree of intercourse between members may be restored. In the meantime, we do hope that all members will support him and the Society by (1) continuing the preparation of papers for which they are responsible, (2) helping in special investigations for the authorities when they are able, (3) keeping the Honorary Secretary informed of new addresses, and (4) sending in notes of their activities of interest to fellow-members (naturally without disclosing any information of a confidential nature).

Quite a number of members are already engaged on special work in connection with A.R.P. lighting, which we have reason to believe is fully appreciated by the authorities. In his Message Mr. Smith pays a tribute to the services in this connection of the retiring President (Mr. Percy Good), whose period of office has certainly been an eventful one. Both he and his successor are making unstinted efforts to promote the special researches mentioned above.

Exterior Lighting for Essential Work

The article in our last issue in regard to A.R.P. Lighting (September, 1939, pp. 185-188) has brought us a number of inquiries, chiefly in regard to the conditions under which a low order of exterior illumination is permissible. This is, of course, an administrative matter, and not one for the Illuminating Engineering Society to decide. When such measures have to be improvised so quickly (they should, of course, have been dealt with long, long ago) some degree of uncertainty is inevitable. The lowest value (0.002 ft.c.) is specifically mentioned in the Emergency Powers (Defence) Order No. 1939, relating to Restrictions on Lighting. Under the heading of "Railways" this value is mentioned in connection with "lights essential for the illumination of important stations and depots," and, again, in connec-

tion with "lights necessary for the conduct of work . . ." in docks (17). The value of 0.02 ft.c., for which a Specification also exists, is not here mentioned. It is common knowledge, however, that in certain circumstances somewhat higher values than this have been sanctioned, and for essential operations not enumerated above. No doubt the position will be more clearly defined before long. In the meantime we understand that permission for the use of such auxiliary lighting should be sought from the local Chief Officer of Police, and that it is incumbent on the applicant to establish that the object is to assist operations essential in the national interest.

A.P.L.E. Annual Report

Although the conference of the Association of Public Lighting Engineers, which was to have been held in Glasgow last month, was necessarily postponed owing to the outbreak of war, the usual annual report is available. It includes a list of papers read before the Association from 1923 onwards, a list of members, and statistical data relating to the number of towns and areas, compiled by members of the Association, and divided into two sections. In Part I. the names of those responsible for public lighting, the population, and the number of lamps and aggregate consumption are given. Part II. contains records of the number of miles of road lighted (gas and electric), with the grade of specification, and also the lighting hours and details of expenditure. The Association thus compiles a most useful annual record, containing data on public lighting not readily available elsewhere.

Carrying On

As mentioned in our last issue "Light and Lighting" is prepared to carry on, and every possible effort will be made to preserve continuity of publication.

In common with almost all journals it has suffered a diminution in advertising revenue. Space devoted to editorial matter has inevitably been curtailed as a result. We regret this necessity, and hope that before long events will justify a resumption of activity by those absent from our columns—in some cases for the first time after a continuous period of many years.

In the meantime we desire to thank those who have helped us to carry on by continuing their advertising. We are happy to know that throughout the past month their services have been in good demand, and we see no reason why this condition should not continue.

Twilight Vision

Our note on "seeing in the dark" in last month's issue has brought us comments from several correspondents who emphasise the importance of allowing intervals for adaptation of the eyes, and the value of even a very weak light under present conditions. As mentioned on page 216 illuminations of the order of 0.002 ft.c. are now being permitted in certain places where essential operations are carried on. But citizens to-day would be thankful for a "ration" of light very much less than this. The above value may be regarded as about one-tenth of moonlight, but starlight, which is certainly of a very much lower order, is by no means to be despised and very much better than no light at all. For many purposes even 0.0001 ft.c. (say about 1/200th of moonlight) would be quite valuable in revealing objects and figures of people, especially if efforts are made to emphasise contrasts by the use of white paint and white clothing or armlets. If, in shopping areas, some such degree of light as this could be allowed to percolate from shop-windows on to the pavement it would materially aid the pedestrian during the coming short winter days, and one would hardly think that this order of brightness would be appreciable from above. Experience of this twilight night life has already stamped home the value of white surfaces. It is evident, however, that not everyone appreciates that their utility really depends on *contrasts*. We can recall, for instance, some flights of steps, whitened all over, on which the treads are by no means easy to distinguish—it would be much better if only the edges of steps were whitened. Experience of the light traps now becoming usual for stores and restaurants also indicates the value of the white guide line recommended in the Specification. Such a line enables one to trace the course of the passage and the whereabouts of corners, otherwise not at all easy to define.

Illuminating Engineering in Australia

We hope it is not too late to report a letter that we received during the summer from Mr. L. D. Wright, the President of the Illuminating Engineering Society of Australia (Victoria), who reported that at that time a membership of 175 had been attained and that it was hoped to reach the 200 mark shortly. The advance in numbers is ascribed to the movement to introduce technical grades of membership—a matter which in this country is necessarily in abeyance for the moment, but has by no means been lost sight of.

We are very glad to note, in this connection, the intention of adopting the description of "Fellow" which is proposed by the British Society. Of great interest is the effort to establish a Federal Constitution, embracing the Societies of New South Wales and Victoria, with additional sections in prospect in Queensland and South Australia which should result in a total membership approaching 500.

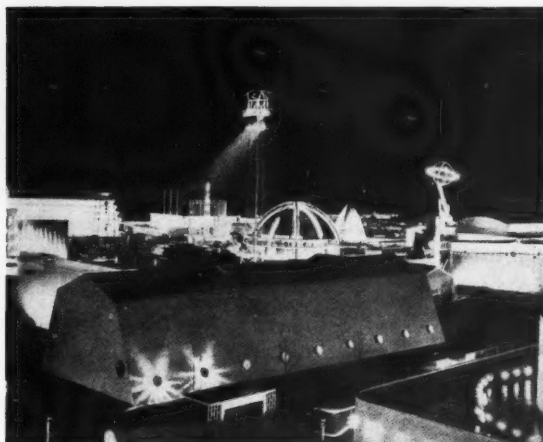
We have previously reported the enterprising step of establishing "Transactions," in addition to the issue of "The I.E.S. Lighting Review," and we have been interested to learn that good openings for lighting experts are becoming evident.

Personal Notes

Readers will join us in congratulating Dr. T. C. Angus, one of the members of the Illuminating Engineering Society, who is associated with the London School of Hygiene and Tropical Medicine, on being granted his D.Sc.

Waldo Maitland, A.R.I.B.A., Comp. I.E.E. Lighting Consultant, and also a member of the Illuminating Engineering Society, has moved temporarily to 26, Regents Park-road, London, N.W.1. (Gulliver 1888.)

Lighting New York's World Fair



A view of the Electrical Plaza, New York's World Fair, showing wall shadow patterns, and blue fluorescent dome lighting of neighbouring structures.

The above picture is one of a number illustrating an account by Mr. Samuel G. Hibben of the lighting of New York's World Fair, which appeared in the last (September) number of "The Transactions" of the Illuminating Engineering Society (U.S.A.). Some of our readers may recall a very pleasant evening some years ago when Mr. Hibben lectured to the Illuminating Engineering Society in this country, devoting much of his address to spectacular lighting. Matters have progressed since then. Features of the lighting now described are the use of blue screened mercury lamps below colour-stippled dome-ceilings, to produce an exact imitation of the deep blue twilight sky, the wide use of fluorescent tubular lamps, and the applications of luminescence and "black light." In some cases it is expedient not to be too rigorous in excluding visible light. Emission of a certain amount of blue and violet light enhances the picture. Very beautiful blue and green fluorescence can be obtained by adding only a minute portion (1 in 100,000 or even 1 in 1,000,000) of amido salt derivatives to the water.

Rationing Coal, Gas and Electricity

The exact application of the Fuel and Lighting Order will, no doubt, become clearer in course of time. Whilst apparently every consumer is entitled to at least 200 units of electricity, 2 tons of coal, and 100 therms of gas, those using more must reduce their consumption by 25 per cent., taking due account, however, of these permissible minima.

It is not clear what view will be taken of the householder who, say, exceeds his permissible consumption of gas and electricity but makes a substantial saving in coal. We seem to recall that in the last great war there was a formula enabling consumers to save on the swings their excess on the roundabouts. We notice that the E.D.A., in a useful bulletin on this subject, argues that the tendency of people to retire to bed earlier during the cold winter months—owing to enforced economy in the use of heat—will make it easy to achieve the requisite saving in lighting. Against this, however, is the fact that many people who previously spent a fair proportion of their evenings out will now remain within doors.

(Since the above was written it has been announced that consumers of gas and electricity will be entitled to 100 per cent. of their previous annual consumption—so that only the diminution for coal consumption is now to be enforced.)

Measurements at Very Low Illuminations

Accurate photometry, at the low illuminations dealt with in street lighting, has always been regarded as difficult to attain, partly because of the inherent difficulty experienced by the eye in judging equality of illumination at this low order of brightness, and partly because of the uncertainties introduced by the fact that light reaches the horizontal photometric surface at such an oblique angle. In view of this difficulty it was provided in the British Standard Specification for Street Lighting* that when the illumination fell below 0.05 ft.c. the photometric surface should be set up normal to the light rays of each lamp and the aggregate effect of them assessed by calculation.

The present conditions of black-out, which have given rise to an order of level brightness far below those to which we are accustomed, have given a distinct impetus to the measurement of light at low illuminations—indeed, it is one of the curiosities of the present period that it seems to have created quite a demand for photometric apparatus in general. The values mentioned in the recently issued British Standard Specifications for low exterior illuminations (sanctioned by the authorities for use in certain circumstances only), 0.002 and 0.02 ft.c. are both considerably below the figure quoted above. Yet it is quite possible that we may be concerned with the measurement of even lower values. One would not care to say that even 0.0001 ft.c. is of no value—it is certainly preferable to complete obscurity.

It is quite possible that existing types of illumination photometers could be so modified so as to enable them to be used for values considerably below their normal range; in fact, we gather that encouraging experiments in this direction are already being made. There will, no doubt, be a field for instruments of this type so modified, capable of reading with fair accuracy.

What, however, is chiefly needed at the present moment is not so much an accurate instrument as a rough "gauge" to ensure that prescribed values are not materially exceeded. The idea of a gauge of this kind is not new; it has been suggested and used, for instance, as an aid to ensure compliance with values of industrial lighting demanded under the Factory Act. Such a device is not difficult to design. The problem is certainly complicated by the low order of illumination to be measured and by the need for extreme simplicity—in view of the fact that such gauges would no doubt be put in the hands of people with little experience of photometry.

From the latter standpoint, the use of a photo-electric device naturally makes a strong appeal, but

unfortunately this method is subject to the very limitation we wish to avoid—that it is difficult to apply at very low illuminations.

Gauges based on the use of small incandescent filament lamps are doubtless practicable, especially if one does not insist on a high order of accuracy and can dispense with rheostat and measuring instrument.

The device which appears most hopeful, however, is that of a gauge based on the comparison of a surface receiving the weak illumination to be tested with a patch of radio-active luminous paint, such as will give a steady low brightness over a considerable period of time.

It may be recalled that a series of tests of such substances was made by a small committee appointed by the Illuminating Engineering Society during the last war. The results were afterwards communicated to the Society by the late Mr. W. C. Clinton.* One of the objects of the experiment was to determine the influence of the radium content on the initial brightness and rate of decay of the compound. In all cases the brightness yielded by freshly prepared substance first increased, and then decreased rapidly, a stage being presently reached when the rate of diminution in brightness was relatively gradual. The weaker compounds, whilst naturally giving a lesser initial brightness, deteriorated less rapidly. It was ascertained that with a content of 0.1 milligramme of radium bromide per gramme of zinc sulphide, the decay in brightness, once the period of stability was attained, was very gradual.

After 200 days from the date of make-up, a very constant value in the neighbourhood of 0.01 equivalent ft.c. was obtained.

Evidently, therefore, it should be possible to prepare materials suitable for comparison with white surfaces illumination with 0.02 or 0.002 ft.c. It is true that photometry at this low order of brightness is difficult, but if the user were only asked to determine when a spot of light was definitely brighter than its surroundings, and not to obtain exact equality of brightness, the task should not be too difficult.

One point of obvious importance, which hardly needs emphasis, is the necessity to allow the eye to become accustomed to the darkness before making a test of this kind.

During the twenty years that have elapsed since the date of the tests mentioned above, the quality of such luminescent material has doubtless been improved, and there should be no great difficulty in preparing specimens, suitably aged, which would maintain their brightness with sufficient constancy for a useful period—perhaps a year or so, after which new test material would be substituted.

* British Standard Specification for Street Lighting, No. 307—1931.

*Illum. Engineer, Nov., 1918, pp. 260-262.

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Literature on Lighting

(Abstracts of Recent Articles on Illumination
and Photometry in the Technical Press)

(Continued from page 196, September, 1939.)

I.—RADIATION AND GENERAL PHYSICS.

255. Colour and Colour Rendering.

C. C. Paterson. G.E.C. Journal, X., No. 3, pp. 172-182, August, 1939.

A verbatim report is given of the Presidential address delivered by the author to the Institute of Physics. The author discusses in detail the colour rendering properties of discharge lamps in general, together with the characteristics of light sources from temperature radiation, and also the measurement of colour.

C. A. M.

II.—PHOTOMETRY.

256. Measuring Light.

J. W. T. Walsh. El. Rev., Vol. CXXV., No. 3,224, p. 325, September 8, 1939.

A new primary standard of light is described, which may eventually be universally adopted. The standard follows closely black body conditions. Improved methods of photo-electric photometry are described, and the advantages of such methods for the photometry of discharge lamp installations in certain cases are pointed out.

R. G. H.

III.—SOURCES OF LIGHT.

257. British Specification for Tungsten Filament Electric Lamps (other than General Service), No. 555—1939.

This revised specification deals with gas-filled train lighting lamps, bus lamps, navigation lamps, road traffic control (electric) light signal lamps, and double-capped tubular lamps. Methods of selection and testing have been remodelled and the various schedules adjusted to meet present conditions.

J. S. D.

258. British Specification for Traction Lamps (Series Burning), No. 867—1939.

This revised specification comprises definitions, specification, and schedules for vacuum and gas-filled traction lamps. Dimensions of caps and socket adaptors for torsion tests are given in appendices.

J. S. D.

259. Two New Artificial Daylight Units.

Anon. El. Times, 96, p. 134, July 27, 1939.

Two discharge-tube type artificial daylight units are described, and are claimed to give a colour independent of voltage variations or life. A 250 watt and a 1,100 watt unit are available.

W. R. S.

260. More Light?

J. S. Dow. El. Rev., Vol. CXXV., No. 3,224, p. 319, September 8, 1939.

Legal standards of lighting are always in the nature of a minimum. Recommended standards, based on good current practice, such as those of the I.E.S., are of greater value. Recommendations based on ideal conditions are usually, at present, beyond economical attainment. The whole problem of the desirable amount of light for a given purpose is surveyed, and methods that have been devised for formulating lighting codes are summarised.

R. G. H.

IV.—APPLICATIONS OF LIGHT.

261. Lighting Trends.

A. B. Read. El. Rev., Vol. CXXV., No. 3,224, p. 323, September 8, 1939.

The slow changes in lighting over the past years are likely to be accelerated by the introduction of luminous discharge tubes in their various forms. The louvre system has had a new lease of life because the present emergency renders desirable fittings which have no glass.

R. G. H.

262. Home Lighting.

J. Priest. El. Rev., Vol. CXXV., No. 3,224, p. 321, September 8, 1939.

The choice of fittings for home lighting should be made

with due regard to efficiency, decoration, and economy. Fittings should blend in design with the general decorative scheme.

R. G. H.

263. Factory Lighting.

W. Robinson. El. Rev., Vol. CXXV., No. 3,224, p. 317, September 8, 1939.

The lay-out of lighting installations for different types of factory are described, with illustrations. Special problems are given consideration. For air-raid precautions, the total obscuration of windows, with an efficient lighting installation, is advocated.

R. G. H.

264. A Unidirectional System of Lighting Double Carriage-way and One-way Roads.

J. G. Christopher, J. S. Smyth, and J. M. Waldram. G.E.C. Journal, X., No. 3, pp. 205-211, August, 1939.

Details, with diagrams, are given of a new system used in a street-lighting installation, together with mechanical and optical characteristics of the units employed.

C. A. M.

265. Salisbury Lighting.

Anon. Elect., 123, p. 219, August 25, 1939; Elect., 123, p. 243, September 1, 1939.

Details are given of a new installation of sodium street lighting equipment at Salisbury. Centralised control is included in the equipment.

C. A. M.

266. Ultra-violet Lighting.

R. H. Finch. El. Rev., Vol. CXXV., No. 3,222, p. 258, August 25, 1939.

The many advantages of lighting power stations by U.V. radiation falling on fluorescent paint are stressed. Fluorescent materials available are discussed, and methods of employing them are suggested.

R. G. H.

267. Lighting Obscuration.

Anon. Elect., 123, p. 210, August 25, 1939.

A discussion is given on the lighting obscuration requirements at industrial premises under the Civil Defence Act.

C. A. M.

268. A.R.P. Lighting.

Anon. Elect., 123, September 1, 1939; El. Rev., Vol. CXXV., No. 3,223, p. 294, September 1, 1939.

Summarises four new B.S.S. specifications, B.S.S./A.R.P. 6, 3, 15, and 16 for lighting of public shelters, unspillable accumulator hand lamp, a fitting for providing a very low uniform illumination and a light-trap for shop entrances respectively.

R. G. H.

269. A.R.P. Lighting. Ways of Meeting War-time Conditions.

Anon. El. Rev., Vol. CXXV., No. 3,224, p. 326, September 8, 1939.

A comprehensive survey of lighting requirements in war time is given.

R. G. H.

270. The New York World's Fair.

Magazine of Light, VIII., No. 5, August, 1939.

Numerous illustrations with details are given of lighting effects produced at the New York World's Fair.

C. A. M.

271. Niagara Falls Gets New Street System.

Anon. El. World., 112, p. 473, August 12, 1939.

Some details and a photograph are given of the newly-installed street-lighting system at Niagara Falls City. The latest design of street-lighting type of filament lamp is used, replacing magnetite arcs, over more than twenty-three miles of streets, and the results are claimed to be excellent.

S. S. B.

272. Dividends from Fair Lighting.

A. D. Dickerson. El. World., 112, p. 463, August 12, 1939.

The object of the article is to discuss the decorative lighting at the Golden Gate Exposition, San Francisco, with its effects on the public, and the future of the art, including some details of a few of the new lighting tools available for such illumination.

S. S. B.



Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

No. 509,515. "Improvements in Illuminated Signs."

The General Electric Company, Ltd. (Communicated by Patent Treuhand-Gesellschaft für Elektrische Glühlampen m.b.H.) Dated March 4, 1938.

This specification relates to illuminated signs comprising double-lined characters which are formed in double outlines by two lamps or two parts of a single lamp, such as a discharge lamp, running side by side and separated by a space. According to the invention the two parts of a lamp or the two single lamps forming the double lines of a character are both supported from a metal strip lying between them so that the surface of the strip is approximately perpendicular to the shortest line between them. Preferably the strip projects on both sides, front and back, beyond the lamp or lamps and it may be coloured or polished.

No. 509,651. "Improvements in or Relating to Glass Lamp Fronts, particularly for Vehicle Head-lamps."

Slawik, M. Dated January 21, 1938. (Convention, Germany.)

According to this specification an anti-dazzle head-lamp front comprises a glass disc with a metal net or screen applied to only the upper part of the glass disc. The screen may be embedded in the glass and preferably has a mesh size from 2 mm. to 6 mm.; the glass may be coloured.

No. 509,723. "Improvements in or Relating to Luminescent Materials for Use With Electric Discharge Tubes."

The Franco-British Electrical Company, Ltd., and Brackensley, A. H. Dated February 12, 1938.

This specification covers a low-pressure mercury vapour discharge tube having an interior fluorescent coating consisting of zinc oxide and silica in such proportions as to correspond to the formula $\text{ZnO} \cdot \text{SiO}_2$. A method of making the composition is described in the specification.

No. 509,736. "Improvements in Portable Lanterns."

Compagnie Generale Des Piles Wonder. Dated November 18, 1937. (Convention, France.)

This specification describes a portable lantern having a colourless glass at the front and faceted coloured glass at the rear and a concave reflector which concentrates light emitted by a source towards the front and has an opening permitting some of the light to reach the rear glass. A mirror is arranged within the concave reflector in front of the opening thereof so as to increase the proportion of light received by the rear coloured glass. When the rear glass is co-axial with the lamp two mirrors may be placed within the reflector symmetrically on opposite sides of the median plane and in front of two apertures symmetrically disposed in the reflector.

No. 509,741. "Improvements Relating to Illuminating Magnifying Devices."

Hill, T. C. F. Dated December 5, 1938.

This specification describes an illuminating magnifying device, including a frusto-conical tubular casing, having a magnifying lens at its smaller end, and having an opening between its two ends, in which is supported, well to one side, an electric lamp bulb,

the interior surface of the casing being adapted to reflect light from the bulb towards the larger end of the casing.

The magnifying device may have a hollow handle and a battery may be enclosed therein.

No. 509,801. "Improvements in High-Pressure Metal-Vapour Electric Discharge Lamps."

The General Electric Company, Ltd., and Schnetzer, K. G. Dated March 11, 1938; October 3, 1938. (Cognate applications.)

This specification relates to high-pressure mercury-vapour lamps, in which the greater part of the vapour present in the full operation is mercury vapour, but also a small proportion of another metal vapour is present. According to this specification the filling comprises thallium, of which the vapour pressure during operation is greater than that corresponding to a temperature of 500 deg. C., and is adjusted in accordance with certain rules set out in the specification, so that the luminous efficiency of the discharge in full operation is substantially greater than would be the case if the thallium were absent, the other factors being unchanged.

No. 509,989. "Improvements Relating to Candles and the Like."

Sanrey, R. G. Dated July 9, 1938. (Convention, France.)

This specification describes a candle comprising a base portion formed in one piece with the body of the candle and of the same material. The base portion is of greater cross-sectional area than the candle body and of such form and size as to ensure the candle remaining in an upright position when placed upon a substantially horizontal surface. A groove may be formed in the upper surface of the base for catching candle-grease.

No. 510,271. "Improvements in Lanterns."

Spaargroom, N. V. Dated December 29, 1937. (Convention, Holland.)

This specification describes a lantern for radiating light of feeble photo-chemical activity for photographic and like work, in which a phosphorescent or luminescent body in the form of a band or strip is moved past a beam of light from a lamp within the lantern and then past a window. The band or strip is thus first excited by the light from the lamp, and the excited portion passes to, and glows through, the window.

No. 510,319. "Improvements in Illuminated Signs."

The British Thomson-Houston Company, Ltd., and Lucas, G. S. C. Dated January 26, 1938.

According to this specification an illuminated sign comprises one or more light sources and light-directing means arranged wholly in front of the source or sources, and consisting of a series of parallel louvres or a honeycomb arrangement of slats, whereby light from the source or sources is directed into a beam having a restricted field. A sign fascia, the characters of which are adapted to be viewed in silhouette against the beam, is arranged immediately in front of the light-directing means, and no diffusing means is disposed in the path of the beam after its passage through the directing-means. Thus, the sign fascia is only visible in the restricted field to which the light beam is confined by the directing-means.

Lighting Restrictions

In what follows we give a summary of the requirements of the Emergency Powers (Defence) Order No. 1098, 1939, dealing with Restrictions on Lighting.

The most important directions issued in regard to restrictions of lighting are included in the Emergency Powers (Defence) Order, 1939, (No. 1,098).^{*} This is a general order addressed to the public. Supplementary instructions have also been issued by departments to certain industries, etc. Although the order is naturally subject to revision (and, indeed, departures from some of the clauses are already being permitted), it forms the fullest statement available. The following summary should be of interest to readers.

MASKING OF LIGHTS.

Part I. (i) consists of two clauses prescribing that no person shall, during the hours of darkness, cause or permit "(a) any light inside a roofed building, closed vehicle, or other covered enclosure to be displayed unless the light is so obscured as to prevent any illumination therefrom being visible from outside the building, vehicle, and enclosure," and "(b) any light, not being a light in a roofed building, closed vehicle, or other enclosure, to be displayed."

(This paragraph, however, does not apply to the display of lights authorised by a chief officer of police or by a member of His Majesty's Forces in the course of his duty.)

Another clause similarly prohibits any skysign, fascia, or advertisement to be illuminated or any light to be displayed in connection therewith.

Part II. deals with a variety of conditions.

LIGHTS IN ROADS.

Paragraph 4 (Part II.) excludes from the restriction imposed above (Paragraph 1, Part I.): (a) lights for the guidance of traffic in roads. (The familiar aperture in the form of a cross in the screening opaque disc defined); (b) lights showing prohibitory or mandatory road signs, route numbers, street names, or direction signs, which must, however, be screened from above and so dimmed that the inscription, though legible at 100 ft., is inconspicuous at a distance of 250 ft.; (c) lights used with illuminated bollards, likewise dimmed and screened, and, in the case of signs, inconspicuous at 250 ft.; (d) lamps indicating obstructions on carriageways of a candle-power not exceeding 1.0, and so screened as to prevent light being thrown upwards and any appreciable glow being produced on the road surface; and (e) any light required for a special purpose authorised by a chief officer of police and complying with any conditions imposed by him.

ROAD VEHICLES.

Lights on vehicles on roads are also excluded from the prohibition, provided that they comply with certain restrictions. Headlamps of a power not exceeding seven watts or the equivalent are permitted, provided that the reflectors of lamps are painted with matt black paint or otherwise rendered ineffective, and certain conditions in regard to the partial masking and dimming (e.g., by inserting behind the glass material "of a density equal to that of two sheets of newspaper") are complied with. In addition, all rear and top windows of side lamps, and all glass panels in rear lamps other than the obligatory red light, are to be completely obscured.

In the case of pedal cycles, the upper half of the front glass must be completely obscured and the lower half of the reflector treated with black paint; side windows (and, so far as possible, other aper-

tures provided for ventilation) shall be obscured; and, finally, the light emitted must be white.

If the headlamp is of a power exceeding 7 watts other conditions are prescribed, namely, that there must be a hood to ensure that no light is visible above eye-level at a greater distance than 25 ft. from the lamp; each lamp is so masked that light is emitted only through a horizontal slit not exceeding $\frac{3}{4}$ in. in width (the upper edge coinciding with the centre line of the front glass of the lamp); the whole of the reflector is blackened and lamps are extinguished on demand or in the event of an air-raid warning.

Stop lights must be so masked that the luminous area (partially obscured as previously directed) does not exceed 1 sq. in. in area.

The transparent panels of direction indicators must be so treated that light is only emitted through an arrow-shaped window having arms not exceeding $\frac{1}{4}$ in in width.

Other directions refer to the obligatory exposure of red lights at the rear of all vehicles and of a white lights when animals (other than a fowl, dog, or cat) are being driven—all lights being shaded and so dimmed that no light is thrown above the horizontal and no appreciable light cast on the ground.

Matt white paint shall be applied to bumpers and to the edges of running-boards.

INTERIOR LIGHTING OF PUBLIC VEHICLES.

The prohibition does not apply to lamps used to illuminate the interior of a tramcar, trolley vehicle, or any other public service vehicle, provided that they are so screened and dimmed that no direct light is visible outside and the illumination from any lamp does not exceed 0.006 ft. c. at any point in the vehicle at a distance of 4 ft. from the lamp.

SIGNS.

External signs used to indicate the positions or directions of police-stations, fire-stations, first-aid posts, hospitals, public shelters, etc., and also signs required to facilitate movement on a private roadway are permissible provided that they are screened from above and so dimmed that whilst clearly visible at 100 ft. they are inconspicuous at a distance of 250 ft.

LIGHTS FOR RESCUE, DEMOLITION, OR REPAIR WORK.

Such lights are permitted as are necessary for urgent rescue work, demolition, or repair work in the hands of authorised representatives of civil defence services, local authorities, public utility and railway companies, etc., provided that they are screened so far as possible above the horizontal and extinguished on receipt of an air-raid warning.

HAND LAMPS.

Hand lamps may be used when an air-raid warning is not in operation, provided that:—

- (1) The light emitted by the lamp is so directed and screened that when the lamp is placed 4 ft. above the ground no direct light from any part of the lamp (including any reflector, etc.) is visible at any point more than 3 ft. above the ground at a distance of 10 ft. from the lamp;
- (2) the lamp is not fitted with movable shutters or screens of any kind;
- (3) the intensity of the light emitted by the lamp in any direction does not exceed 1 candle-power;
- (4) the light is white.

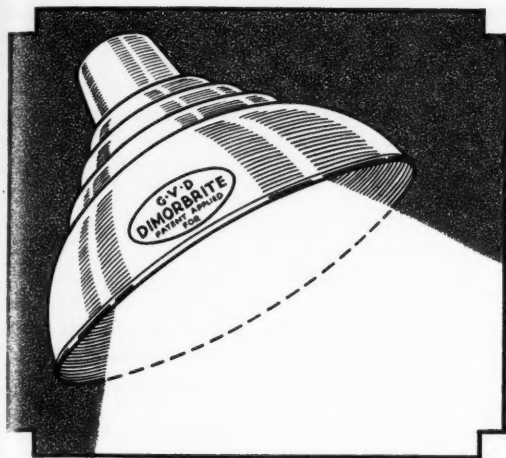
RAILWAYS.

The following lights are permitted in connection with the operation of railways:—

- (1) essential lights required to indicate obstructions in so far as they comply with the following conditions, namely: that the candle-

^{*} Available from H.M. Stationery Office, price 2d. net.

A.R.P. LIGHTING



**75% REDUCTION IN YOUR LIGHTING BILL!
YET
BETTER LIGHTING!**

This fitting can be used in every type of building and every type of room. Using the smaller model, a 5 watt lamp will be found ample for landings, corridors, lavatories, etc.; a 15 watt will generally be suitable for entrance halls, also for table standards, while anything from 15 to 60 watts will suffice for pendants in living rooms, bedrooms, small offices, etc., according to the size and height of rooms and spacing of points.

The 60/150-watt model is suitable for larger areas, such as factories, large offices, halls, churches, etc.

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Phone: HOLBORN 7277-78.

BS/ARP SPECIFICATIONS FOR LIGHTING EQUIPMENT

Prepared by the Illuminating Engineering Society:—

BS/ARP 16 (0.002 foot-candle)

BS/ARP 20 (0.02 foot-candle)

BS/ARP 15 Light Locks for Shop Entrances

Affording a means whereby persons may enter or leave shop premises at night without visible light escaping from the interior.

Fittings for both gas and electricity, furnishing even illumination of low intensity.

Price

3d. each

(post free)

Also Available:—

BS/ARP 3 Electric Hand-Lamps

For general use out-of-doors or in buildings in which the windows, roof lights, etc., are not screened.

Price 2d. (post free 3d.)

BS/ARP 7 Electric Lighting of Report and Control Centres

Gives the general requirements for electric lighting of report and control centres.

Price 6d. (post free 8d.)

In Preparation:—

(with the co-operation of the Illuminating Engineering Society)

Fittings for Providing Even Illumination of Low Intensity (0.2 foot-candles)

Fluorescent and Phosphorescent Paints

Gauges for Checking Illuminations of Low Intensity

The above Specifications may be obtained from:—

British Standards Institution, 28, Victoria Street, London, S.W.1

power does not exceed 1.0 and that no light is thrown upwards and that no appreciable glow is produced on the ground.

- (2) (a) Searchlight and multiple lens colour light signals which are screened by hoods two feet or more in length;
- (b) other signal lights.
- (3) head lamps and tail lamps of trains.
- (4) lights essential for the illumination of important stations and depots, in so far as they comply with the following conditions, namely: that they are so screened that no light is thrown above the horizontal and that the direct intensity of illumination at ground level or on any surface visible from the air does not exceed 0.002 ft.c.
- (5) lights essential for the internal illumination of signal boxes in so far as they comply with the following conditions, namely:—
 - (i) that they are so screened that no light is thrown above the horizontal;
 - (ii) that the intensity of illumination is reduced to the minimum necessary for the operation of the signals;
 - (iii) that no direct light is thrown on any part of the window area of the signal box.
- (6) lamps in trains used for internal illumination in so far as they comply with the following conditions, namely:—

that the intensity of illumination does not exceed 0.006 ft.c. at any point at a distance of five feet from the lamp and, in the case of any lamp other than five-watt blue-sprayed neon lamp, that each lamp is covered with some completely opaque material so that no light can pass except through a single circular aperture at a base not exceeding $\frac{3}{8}$ in. in diameter.

DOCKS, HARBOURS, PIERS, QUAYS, ETC.

Lights for use in any ship or vessel or for the conduct of work in connection with the above are permitted, if they are either emitting light to an intensity measured on the ground not greater than 0.002 ft.c., no direct light being visible above the horizontal, or if the light is a shaded lamp of a candle-power not exceeding 1.0, also in the case of any ship or vessel (not lying alongside a pier or jetty quay wharf, or jetty), lights authorised by order of the Admiralty. Lights used to indicate obstructions and other danger points must also have candle-power not exceeding 1.0, and that no light must be thrown above the horizontal and no appreciable light thrown on the ground.

(Some of the above conditions are doubtless in course of modification. It is reported, for example, that a new form of mask for headlamps which will render compliance with the restrictions simpler and more clearly defined, will be available shortly, and that the restrictions on interior lighting for vehicles may be, in some cases, relaxed. It will be observed that whilst the only level of general exterior lighting mentioned above is 0.002 ft.c., fittings have been specified (BS/ARP 16), to furnish not only this level of illumination, but also 0.02 ft.c. (BS/ARP 20), and a third specification, covering fittings to provide 0.2 ft.c., is in course of preparation. These higher values may, subject to certain limitations, be permitted for operations of national importance. In all such cases applications should be made to the Chief Police Officer of the area concerned.)

The Lighting of Air Raid Shelters

The provision of artificial lighting in air raid shelters is obviously an important matter—though we believe that it was, in fact, overlooked in the earlier designs.

Very useful information on this point will be found in a recently issued British Standard Specification (BS/ARP 6), which relates to shelters for fifty persons (210 sq. ft.), or multiples up to 200 persons. Part I. deals with the case where no main supply is available, and assumes lighting from batteries furnishing a 12 volt supply. For a shelter holding fifty persons five lighting points should be provided. The specification gives directions in regard to switches, batteries, lamps, and wiring. A practical item is the proposed "instruction sheet," giving information in regard to treatment of battery, replacing lamps, and fuses, etc.

Part II. deals in a similar manner with the method to be adopted where a main supply is available. The first version of the specification was apparently framed for A.C. supply, but the revised edition is equally applicable to D.C. circuits. In this case 12 volts is again specified, but there are ten points, with circuits suitably divided.

The treatment of larger shelters, capable of accommodating 250 people or more, where a self-contained generator is considered advisable:—Such cases are dealt with in another specification (BS/ARP 17), whilst yet another (BS/ARP 7) covers Report and Control Centres.

The E.L.M.A. Lighting Service Bureau to Carry On

We note with satisfaction the announcement of the Electric Lamp Manufacturers' Association of Great Britain that the Lighting Service Bureau at 2, Savoy-hill, W.C.2, will continue its work of collecting and disseminating information on lighting matters. One great service rendered by the Bureau to the electrical industry, that of insuring the goodwill of customers, will thus be preserved and the importance of this service throughout the coming difficult period should not be minimised.

But the services of the Bureau, on a broader basis, in acting as a centre for the dissemination of information on illumination and furnishing what are surely unique facilities for staging lighting demonstrations, are likely to prove of equal value. The preoccupation of the public with "blacking out" problems and its experience of what happens when external illumination is reduced to a minimum has rendered the public mind unusually susceptible to impressions in this field. Now is the time when educational effort should be strengthened rather than abandoned.

War conditions have made it necessary for certain revisions to be made in the actual operation of the Bureau, but its policy remains the same. Every effort is being made to promote an economic and scientific use of light, thus conserving fuel resources. Data are being collected on all subjects relating to the black-out. Information is being prepared bearing on the best methods of complying with the restrictions in the use of electricity.

It is hoped shortly to arrange an exhibition, features of which will be the display of special fittings for use in a variety of circumstances and an exhibition of all the chief forms of light-traps available.

Lighting the School Stage

by FREDERICK EVANS, M.B.E., M.A. (Cantab.)
(Director of Education, Erith, Kent.)

During the present conditions, when the general darkening of streets makes travel difficult and throws people on their own resources, private efforts, both for education and entertainment, are of special value. The following suggestions in regard to stage lighting equipment should therefore prove useful. The author refers more particularly to the school stage, but his remarks apply in the main to the stages contrived by small amateur organisations, of which there are said to be some thousands in this country.

The provision of a properly equipped stage is becoming increasingly a feature in the accommodation of modern schools. Dramatic work has become in many schools an essential part of the curriculum. Around the school stage there can be centred projects of great educational value. There are the study of the play, the training in speech and elocution, the development of personal poise and confidence, and, of course, the application of music to a stage production. Then numerous other school studies can be linked with the stage project. There is art and the design and painting of school settings, the crafts and the preparation of properties, and the making of scenery.

There is hardly any school subject which cannot be linked with the project of a school play or oratorio. In the history lesson can be ascertained the correct costumes, scenery, and properties for the play. Period plays can be accurately presented, and even the historical development of the drama illustrated on the school stage. Through geography can be obtained information as to locations, costume, and settings all over the world, and in the calculations and accounting necessary if a play is to be presented and made to pay for itself mathematics will play a part.

The Study of Lighting.

But perhaps the most important ancillary subject to the school play will be the scientific study of lighting as specifically applied to the stage. Problems of dimming, switching, and mixing of coloured lights can be studied, not hypothetically in a laboratory, but in relation to the actual activity represented in the drama. Reality is thus obtained and this is of great importance in giving vitality to the teaching. Lighting schemes and plans can be worked out for particular plays, the intensities of the light required can be studied, and the costs of such lighting can be calculated so that they can be included in the general costs. So often are these "hidden" costs overlooked in a school.

Thus the school stage can, in sympathetic hands, acquire the status of the most important practical room in the school. Aesthetic and practical values meet here. Literature and music are here associated with science and with the practical arts and crafts. In this development electric light is to-day essential, for it has made possible not only the efficient lighting of an acting space, but has added to the significance of the dramatic settings through the use of coloured lights and of controlled lighting to give an almost unlimited range of effects.

Lighting Equipment.

These are, however, hardly possible in the "fit-up" stage. They require proper switchboards with

dimming and mixing devices, and, above all, they must be absolutely safe. This implies the need for properly designed, or, at least, properly equipped school stages. Heath Robinson-electrical "fit-ups" for stages are not only inefficient but positively dangerous, and in schools safety is essential. Nothing can excuse the tragedy of fatalities from burns on a school stage through the use of an amateurish "fit-up" lighting set.

In technical schools and evening institutes, especially, the well-equipped school stage may quite well be the basis of useful courses of training in the electrification of the theatre. Not only will such a stage be of value in the general education, but it will have this specific application as well. In one evening institute which I know there is an excellent evening course in the theatre arts and in play production, largely because the school has a purpose-built stage with modern electrical equipment.

A Typical School Stage.

The description of this stage will serve to illustrate the point. It is about thirty feet wide by twenty-five feet deep, the proscenium arch being twenty feet wide. The proscenium has a set of footlights of the compartment type, these being fitted with one hundred watt lamps behind red, blue, and green or amber gelatines. The different colours are separately circuited and switched, and are for all circuits fitted with dimmers.

At each side of the proscenium, and masked by it, are strips of vertical lights, again of the compartment type, and fitted with a triple circuit—one for each colour. Each colour has a dimmer as well as a separate switch.

Above are three separate battens, of the compartment type again, tricoloured, triple-switched, with dimmers for each circuit. These battens are masked from the audience by velour borders or valances suspended on steel barrels.

There are a number of plugs around the stage to which auxiliary or occasional lights can be attached. From the main switchboard can also be controlled two large floods on stands, one at each side of the stage, these having detachable gelatine slides, so that any colour light can be thrown on to the stage. A front-of-the-house spotlight completes the electrical equipment of a stage which is an excellent example of what can be done in a school. The stage has "legs," or wing curtains, a middle-cloth, and a back-cloth in a light fawn velour. This colour takes the mixed lighting effects very attractively, and audiences are amazed to see results which they usually associate only with the professional stage.

Specification of Lighting Equipment.

It may be of interest to give the actual specification of the lighting equipment on this stage. It is as follows:—

1.—ELECTRICAL WORK.

Dramatic Stage.

ONE Magazine type footlight forty-eight compartments at 7 in. centres: 28 ft. in all. Silvered glass reflectors, lamp holders combined wire guard and metal frame with gelatine wired for three circuits, complete with disconnection box.

TWO 28 ft. Battens, same number of compartments as footlight, and with tilting gear for hanging to barrel.

TWO Wall Link Boxes, 18 ft. Asbestos covered multiple for connection of Battens to Wall Link.

FOUR 6 ft. lengths of open type Side Lighting with Lampholders at 7 in., centres wired for three cir-

cuits with three Locking Plugs fitted with wire guards and mounted on telescopic stand.

ONE Switch and Dimmer Board for Battens and Footlights, comprising 9-1,600 watt sliding type dimmers for Battens and footlight circuits controlled by:—

9-15 amp. D.P.I.C. Switch fuses.
2-1,800 watt sliding type dimmers for side lighting troughs controlled by:—
2-15 amp. D.P.I.C. Switch fuses.
The whole mounted on Angle Iron Framing on enamelled slate base.

2.—GEAR. (To supply and fit.)

Dramatic Stage.

(for Proscenium Curtain) Hall's Patent Steel Track with hand-control winch.
Hall's track for one mid-stage curtain as above (curtain size 17 ft. drop by 29 ft. wide).
Steel Barrels to hang Backcloth 29 ft. to hang Wing Curtains, one pair 2 ft. wide and seven pairs 4 ft. wide.
To hang four Borders—35 ft. wide.

3.—CURTAINS ONLY.

Dramatic Stage.

Proscenium Curtain, Velour with one line applique, lined suitably.
Mid-Stage Curtain, 17 ft. drop, 29 ft. wide, as above, but no applique.
Back Cloth, 17 ft. drop, 29 ft. wide, as above.
Wing Curtains.
ONE—9 ft. wide, 17 ft. drop (to hide stairs).
ONE PAIR—2 ft. wide, 17 ft. drop.
SEVEN PAIRS—4 ft. wide, 17 ft. drop.
Borders.—Four, 35 ft. wide and 5 ft. drop.
There should also be available asbestos blankets, suitable chemical fire extinguishers, and fire buckets on the stage. These are of exceptional importance.

Another less ambitious method is to fix in the stage ceiling a number of parallel bars running towards the proscenium. Across these are fixed, by detachable clips, battens holding the lights or, alternatively, the borders to mask the lights. The detachable clips enable these rods or battens to be placed in any position, so that the best effect is obtained and the battens with the borders placed so that the line of sight of the audience is masked in relation to the light battens.

In this light kind of structure coloured bulbs are usually used, each colour being separately switched and, if possible, dimmed. A similar simple set of masked footlights can be used with floods at the sides, and possibly a spotlamp working from the front. Plugs each side of the stage provide the means of occasional lighting. The battens and footlights

are attached to the switchboard by armoured, flexible connections, to allow for a full range of movement without danger. The "house lights" are controlled from the same switchboard.

Objects of Stage Lights.

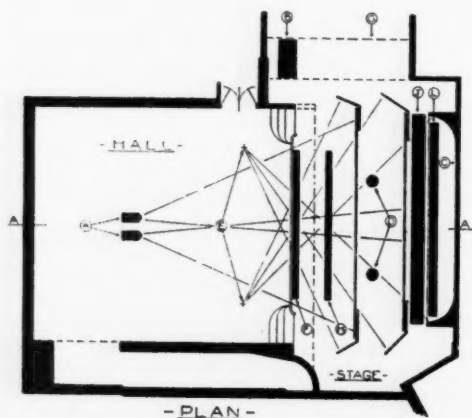
Thus it will be seen that stage lighting installations are designed first to illuminate the whole stage evenly and with well-diffused light of any colour, and second to provide relief to this lighting by applying "high lights," or special illumination to individual objects or persons through the use of floods from the sides or spotlights from in front. In this way sunshine or moonlight can be simulated. The backcloth and skycloth or cyclorama should be capable of being completely illuminated so as to reproduce night and day, inside and outside effects. Often the backcloth is in reality a light plastered wall and this will take floodlighting very effectively.

Architects, electrical engineers, and directors of education will find in a booklet published by the Strand Electric and Engineering Company and entitled "Stage Lighting" much to assist them in designing and planning school stages. This firm is one which has made a speciality of this type of work. What can be done in a particular case will depend upon the amount of money available, the size of the stage, and whether a simple or a complex installation is in view.

It will be well to spend as much as possible upon the electrical supply to the stage and also upon the switchboard and dimmers. The latter should be designed to permit of subsequent elaboration and of the future development of the stage lighting system. Another method is to fit the switchboard and plug supplies and to hire the lighting battens, footlights, floods, and spotlights for special occasions.

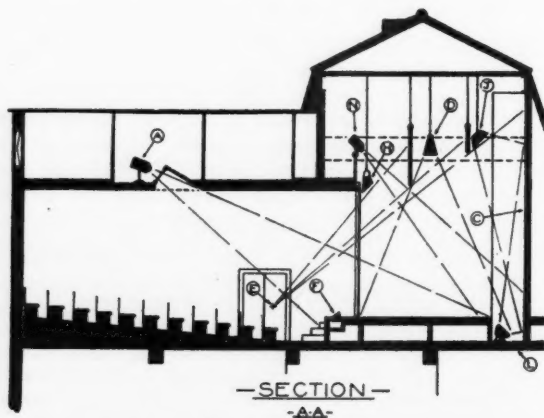
The ideal is, however, a purpose-designed stage where the architect, the electrical engineer, and the director of education have all co-operated to make it as complete and well equipped as the money available permits. No new school for senior or junior children should be without such a stage.

It will be seen that the school stage offers the electrical engineer many opportunities of designing an installation well fitted for its purpose. If he does this he will earn the undying gratitude of all the teachers and pupils in that school.



Key for lighting school stage, including cyclorama.

- | | |
|--------------------------------------------------------------------|-------------------------------|
| A. Front of house spot-lights to flood fore-stage and acting area. | F. Footlight. |
| B. Switchboard and dimmer regulator. | G. Fly-gallery. |
| C. Cyclorama. | H. Magazine batten. |
| D. Acting area lanterns. | J. Cyclorama top lighting. |
| E. Sight lines of spectators. | L. Cyclorama bottom lighting. |



Key for lighting school stage, including cyclorama.

- | | |
|--------------------------------------------------------------------|-------------------------------|
| A. Front of house spot-lights to flood fore-stage and acting area. | H. Magazine batten. |
| C. Cyclorama. | J. Cyclorama top lighting. |
| D. Acting area lanterns. | L. Cyclorama bottom lighting. |
| E. Sight lines of spectators. | N. Bridge spotlights |
| F. Footlight. | |

(We are indebted to the Strand Electric & Engineering Company, Ltd., for the two illustrations, representing typical equipment for the school stage, which appeared in a recently issued booklet on stage lighting.)

Complies ★ with **BS/ARP 16**

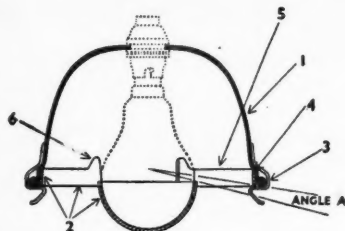


BS/ARP 16 contains the following statement: "This specification covers the design of lighting fittings which may, under special circumstances, be authorised to be left in operation during an air raid, so as to permit of certain essential work being carried on and the movement of people where this is necessary.

MAZDALUX REFLECTOR

FOR PROVIDING EVEN ILLUMINATION
OF LOW INTENSITY (0.002 f.c.)

(Complies with BS/ARP 16)



MECHANICAL FEATURES

- (1) Spun body finished with cellulose paint for long life and durability.
- (2) One-piece light baffle consisting of cup, three webs and locating ring, die cast for rigidity and strength.
- (3) Spring clips for easy removal of the light baffle for lamp replacement.

OPTICAL FEATURES

- (4) The angle "A" is extremely critical. The use of a one-piece rigid baffle and a shoulder against which the locating ring beds, ensures the accurate control of this angle.
- (5) Narrow webs ensure no light obstruction and therefore absence of patches on the ground.
- (6) Dogs on the three webs hold the lamp in position, preventing sideways movement.

Intended for use on a bayonet cap lampholder with shade carrier ring. Where there is an existing point fitted with G.E.S. or E.S. holder, BTH Reduced Lighting Adaptors are available.

SPECIAL NOTE. These Reflectors are supplied suitable for mounting heights of not less than 10 feet, 15 feet and 20 feet.

WRITE FOR LEAFLET L.687/M.



BS/ARP 16 has been issued by the British Standards Institution at the request of the Air Raids Precautions Department of the Home Office.

THE BRITISH THOMSON-HOUSTON CO. LTD.,
CROWN HOUSE, ALDWYCH, LONDON, W.C.2

M3840



NOTES ON ILLUMINATING ENGINEERING ABROAD

(Specially Contributed—H. L. J.)

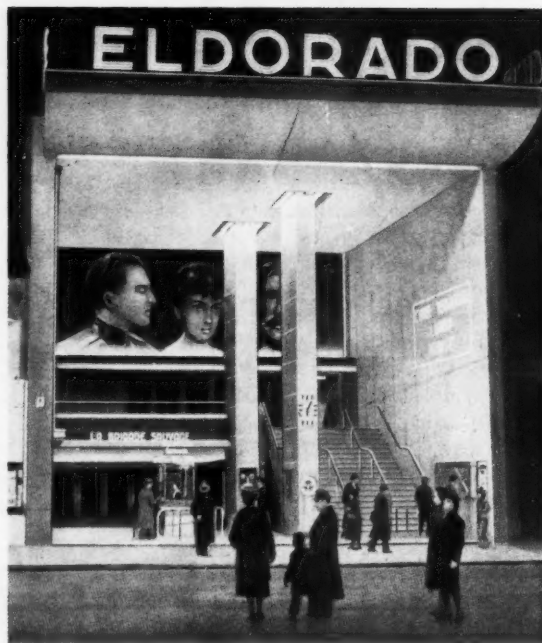
United States.

In a contribution to "The General Electric Review" (U.S.A.) Mr. R. J. Swackhamer emphasises the growing importance of lighting provisions in the field of sport, and gives details of installations of major importance. He recalls that night games did not come into fashion until after 1930. In 1935 a floodlighting system for a baseball field was installed in Cincinnati at a cost of \$60,000. The seven night games which were played during the first year after it was put into service enabled the club concerned to reimburse themselves for the total cost of erection. In 1938 a floodlighting installation for similar purposes was put into service in Brooklyn. This likewise proved successful and similar installations are now being erected at the rate of three a year. The Brooklyn installation consumes an amount of electrical energy equal to that needed to light 200 miles of highway—which, the author remarks, is a complete street lighting installation for a town with up to 100,000 inhabitants. At present the average illumination all over the playing area of the field is fixed at 100 ft.c. The connected load at Cincinnati is 1,096 kw. Both player and spectator are satisfied that there is comfortable observation of all stages of the game, and higher illumination levels do not seem necessary. The minimum illumination values regarded as effective in other areas are 10-15 ft.c., but it is desirable to maintain them between 50-70 ft.c. A 1,500-watt general service Mazda is the type of lamp used. This is operated at 10 per cent. over normal rated voltage, giving 35 per cent. increased light output, with a corresponding increase of 16 per cent. in power consumed. The disadvantage that the life of a lamp thus overrun is by approx. 70 per cent. need not be regarded as a serious deterrent to its use. The resultant 300 hours of life should prove satisfactory, bearing in mind that only about 200 hours of use are required per season. The reflector units are put together into batteries on towers at appropriate places, with mounting heights of 130-160 ft. Six locations for such batteries should prove sufficient to give even illumination all over the playing field; if, however, the mounting height cannot exceed 100-130 ft. eight locations are advisable. Experience has shown that the reflector used should be capable of adjustment, enabling the beam projected to be adjusted according to local circumstances and the nature of the game played. For reasons of economy the transformer is situated as near as possible to the installation. In addition separate fuses are provided for each floodlight. The total number of playing fields equipped with lighting installations since 1930 is 112.

Switzerland.

M. P. Rollard, in the "Bulletin de l'Association Suisse des Electriciens," suggests the application of a pilot lamp system for street lighting for A.R.P. purposes. One pilot lamp is connected in parallel with a clock-controlled circuit of four to five normal street lamps. The pilot lamp operates on 12 volts, the normal lamps, as usually, on approximately 220 volts. A step-down transformer (220 volts to 12 volts) is provided in the circuit. A relay situated in the pilot lamp-feeder will not open at the standard pressure, and thus protects the 12-volt lamp. If, however, the voltage is reduced to 12 volts by the transformer, the pilot lamp lights up. The same pressure (12 volts) will then be on the street lamp circuit, but this is without effect as 220-volt lamps do not give an appreciable glow at pressures of less than 15 volts.

Belgium.



The above picture of a new cinema in Brussels has been singled out for comment as a design of some architectural interest, in which light-contrasts have been utilised to reinforce the structural appearance and attract visitors.

France.

In the "Bulletin de l'Association Française des Electriciens," M. M. Mallein surveys the development of television in France. Development has now reached a stage favourable to standardisation and possible international action. Reviewing progress, the author remarks that this line is the most likely to be adopted internationally. What are the present problems to be dealt with in the line of research? With regard to the sensitiveness of the apparatus for taking of pictures (iconoscopes and emitrons) this still leaves room for improvement, and the clearness of the picture is not yet satisfactory. The cost and dimensions of valves should be reduced to permit a smaller camera. For transmission the use of co-axial cable for feeding purposes has answered well. Research is also being directed towards using the telephone system for transmission. At present it is not possible to run more than one transmitter, and, therefore, one programme within a certain area. Size, price, and standardisation of receiving sets are now vital questions to-day, particularly the size of the screen. The studio from the Eiffel Tower will probably be transferred to a more modern building, specially built for this purpose, where there will be provision for simultaneous or successive use of several cameras during the same performance. In addition, equipment for outdoor picture-taking to facilitate transmission from actual events is being developed. In addition to the present transmission from Paris, provision is being made for transmission from Lille and Lyons and later from Marseilles. The Lille transmission is already being received at Roubaix, 12 km. away, with satisfactory results.

Electric Signs

There are many sections of the lighting industry which, in the present circumstances, are carrying on with considerable difficulty, but there are probably few whose business has been more completely curtailed than makers of electric signs. In the circumstances, one cannot but admire the pertinacity and courage of "Signs" in carrying on. In the October issue of that journal we notice a discussion on one point of great importance to the sign industry—the fact that, according to the Lighting and Restrictions Order, electric signs are forbidden by day as well as by night. Representations have been made by the Master Sign Makers' Association to the Authorities on this point, but, so far, apparently without success.

Still Orders for Street Lighting!

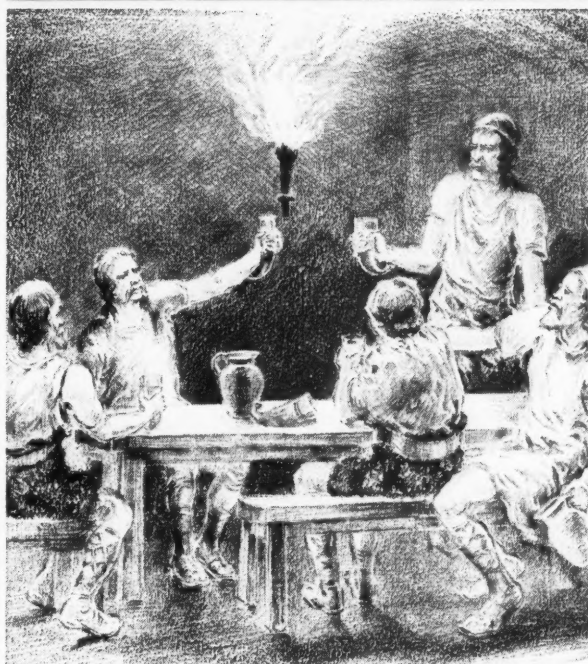
In view of the general black-out it might be assumed that all street lighting business, in the ordinary sense, has come to an end. Quite a number of schemes were under way at the outbreak of war. In some cases these have been abandoned and material already delivered has been disposed of. Not all, however. According to the "Electrical Review" a number of authorities are carrying through schemes already commenced, considering that this is in the long run the most economical plan, and reflecting that the present position cannot last for ever. We have even heard reports of cases in which new lighting equipment has been ordered, the view being, perhaps, that it is not a bad plan to get essential changes made during the present period.

Electric Hand Torches

Their Use and Misuse in "Black-Outs"

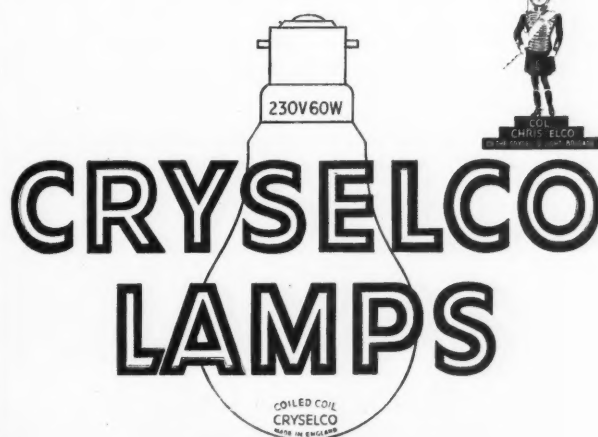
Those who have had some experience of making their way along unlighted streets when there is no moon will no doubt have formed very definite ideas on the qualities desirable in torches used to alleviate the "black-out." Some limitations are put on performance in the Order (No. 1098) relating to lighting restrictions; the power being limited to 1 c.p., and conditions intended to limit the direction of light upwards specified. Useful requirements are also embodied in a British Standard Specification (No. BS/ARP 3), in which the screening of the light, and especially the limitation of upward light, is studied. This, however, related primarily to torches for wardens and other official use. Subsequently the restrictions in regard to the use of torches by the public have been relaxed. Experience shows that out of doors something considerably less than 1 c.p. would probably suffice. Even more important, however, is the softening and diffusing of the light so as to cause less dazzle, both to the user and to others whom he may meet. From this standpoint the torch, as sold in the shops, is quite unsuitable with its very concentrated beam furnishing an intense, but streaky, illumination. There would be no harm in encouraging the interposing of a larger area of diffusing material in front of the lamp bulb, if furnished with suitable screening devices. The most difficult problem is the misuse of the torch. At first sight a design which would go out automatically when pointed upward seems simple, but this, as the writer discovered twenty-five years ago in similar circumstances, is not so easy as it appears.

LIGHT THROUGH THE AGES

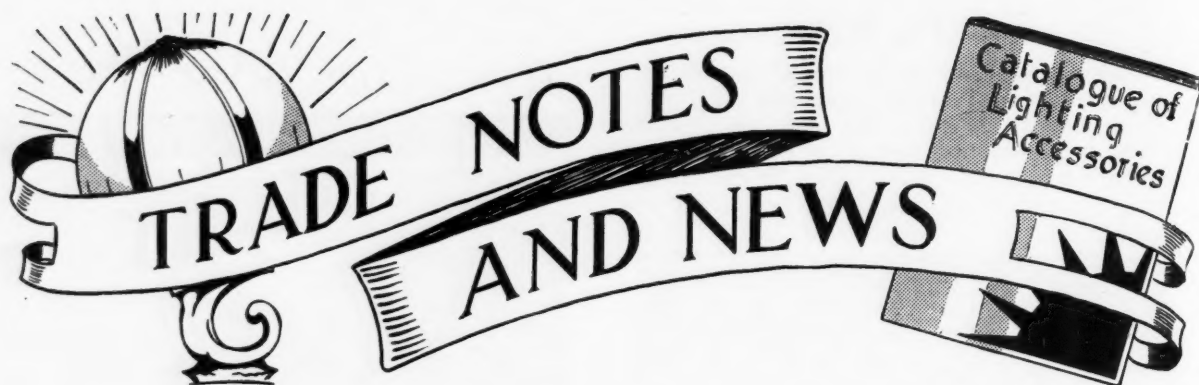


The Saxons

In the early centuries of our history man worked largely by daylight, for artificial illumination was very primitive and often expensive. Such lighting as was generally available was obtained by burning torches of resinous material.



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Fittings to Furnish Low Illuminations

We remarked in our last issue on the promptness with which leading firms in the lighting industry had introduced fittings furnishing illuminations of 0.002 ft.c., in accordance with the specification BS/ARP/16. This fitting, and also that to furnish 0.02 ft.c. (BS/ARP 20), are fully described in leaflets that have reached us from, amongst others, the British Thomson-Houston Company, Ltd., and the Edison Swan Electric Company, Ltd. (The latter features other useful black-out reflectors and units housing 15 w. lamps, suitably screened to furnish the fashionable "dim, blue glow.")

We illustrate one of the fittings of the 0.02 type, now being listed by the General Electric Company, Ltd.

G.V.D. Illuminators, Ltd.

We learn that G.V.D. Illuminators, Ltd., the exponents of "controlled lighting," are adapting their activities to war-time requirements, well recognising that good lighting is more important than ever under present conditions which not only both increase greatly the amount of overtime and night work but often compel the use of artificial lighting during the day as well.

When a really efficient "black out" can be secured it is considered much the best plan to dispel gloom within the interior by means of good general diffused lighting, such as the familiar G.V.D. units are designed to afford. However, in view of the demand for economy, and in order to meet emergency conditions, a scientifically designed A.R.P. reflector—the G.V.D. "Dimorbrite"—has been evolved. This will take any lamp within a wide range, in each case furnishing a well-distributed cone of light. No direct light can escape upwards or fall on walls or windows, nor is the eye irritated by bright light catching the lip of the reflector.

The company is also prepared with designs to furnish soft, well diffused, and evenly distributed outdoor lighting—if and when the present lighting restrictions are relaxed.

"Business as Usual"

This slogan is again being raised. There was, one recalls, during the more intense period of the last Great War, a tendency to comment rather caustically on this aim. Yet it is by no means an ignoble one. Indeed, it expresses one of the greatest services that those not in the firing line can render. If this country has again to finance a long and costly war, the more concerns that can carry on, and the more people who can earn or make a living without relying on the State, the better!

This illustration shows the G.E.C. reflector designed by the General Electric Company, Ltd., to comply with the British Specification BS/ARP 20, furnishing 0.02 ft.c.



Trading With the Enemy Act

The General Electric Company, Ltd., wishes to state that the Osram companies referred to in the list of enemy concerns are subsidiaries of the Osram G.m.b.H. of Berlin, and have no connection of any kind whatsoever, financial or otherwise, with the G.E.C. The well-known Osram lamps and valves are made in England entirely out of British and Empire materials. The Osram trade mark for Great Britain and the British Empire is owned exclusively by the G.E.C., which is itself an entirely British company under British control.

We have been requested to point out that the various "enemy traders," of whom some mention has been made in the Press, and with whom the name "Siemens" is associated, are branches of Siemens and Halske and Siemens Schuckert Werke, Berlin, and not of Siemens Brothers and Co., Ltd., London and Woolwich—a British-owned firm—or its subsidiary, Siemens Electric Lamps and Supplies, Ltd., London and Preston.

G.E.C. Men in the Forces

The General Electric Company, Ltd., has 2,135 of its employees serving with the combatant forces. One-third of the total male staff in the sales organisation is with the colours. This company gives a generous allowance to all employees with the Forces.

Catalogues Received

- BRITISH THOMSON-HOUSTON CO., LTD.—Catalogue of Mazda-lux Industrial Lighting Equipment, reflectors, wellglass and bulkhead units, floodlights, etc.
- EDISON SWAN ELECTRIC CO., LTD.—General Catalogue of Ediswan Lamps.
- GENERAL ELECTRIC CO., LTD.—List giving particulars of G.E.C. Equipment for Photographic Studio Lighting.
- SANGAMO WESTON, LTD.—Leaflet referring to Weston Lightmeters.
- VERITYS, LTD.—Catalogue featuring complete Lighting Equipment for Electric Discharge Lamps.

The Illuminating Engineering Society (U.S.A.)

Notes on Transactions (September, 1939)

NEWS: A New Orleans company attempted to register the trade mark "I.L.S." for a portable electric lamp of their manufacture. The Society filed an Opposition Proceeding on the grounds that such a mark conflicted with their own of "I.E.S." Court judgment was in favour of the Society.

Mr. Louis B. Marks, first President and one of the founders of the I.E.S., has inaugurated a comprehensive library on illuminating engineering during the last thirty years. This has now been presented to the Society and forms the basis of the Society's library at headquarters, under the name the "Louis B. Marks Library."

Three new germicidal lamps are announced by the G.E.C. Data: tubes, 3, 5, and 15-w., U.V. radiation within the range of effective germicidal operation controlled by the special glass bulbs in which housed.

SUBJECTS OF PAPERS: "How New York World's Fair Exhibitors Use Light," by S. G. Hibben. A detailed description of the lighting arrangements at the Fair are given. Among others the following novelties are mentioned. Water lighting effects: the waterfall constructed near the Electric Utilities building is floodlit by m.v. lamps, the sloping water surface is 85 ft. by 40 ft., and 1,500 gallons of aerated water per minute flow down this weir. At night it is floodlit by a battery of thirteen 400-W. capillary m.v. lamps mounted 120 ft. high, in aluminium 14-in. narrow beam louvred flood lights, distance from waterfall 125 ft., giving a minimum luminous intensity of 8 f.c. The effect is most striking owing to the cool white of the water and the intense green of the sloping face of the weir. The Italian Pavilion also shows illuminated waterfalls which, besides normal floodlighting effects, are irradiated by nine U.V. (black) lamps. An addition of one part of amino-salt derivatives to 100,000 to as low as one part in 1,000,000 of water produce quite a novel and beautiful fluorescent effect of blue and green in the actual waterfall.

"Specification Points of Brightness," by H. L. Logan. Investigation of brightness distribution in visual fields under daylight conditions are described; among these: "Fresh Snow," "Rough Water," and

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"An Analysis of Photoelectric Classroom Lighting Control," by D. P. Caverley. A review is given of methods and efficiency of photoelectrically controlled devices, including financial aspects of the matter and finding in the end that the layout of the schools of to-morrow will do away with the academic system of lighting with six 500-W. luminaires photoelectrically controlled and will ask for individual treatment according to modernised architectural layout.

"... and the Dissemination of Knowledge Relating Thereto"—in Europe," by C. A. Atherton, gives an account of lighting activities in general in Europe. The paper covers a wide ground, and describes the operations of scientific societies and trade and technical organisations, in Europe, besides referring to the various journals concerned with lighting, the courses of instruction in illuminating engineering arranged in colleges, and the applications of light in connection with exhibitions, etc.

"Photoelectric Photometer for Rapid Comparison of Two Light Sources," by F. A. Ryder, J. T. Gier, and L. M. K. Boelter. Fundamental criteria are derived from photoelectric photometers of the rapid comparison or so-called "flicker" type. A photometer is described which eliminates certain errors of geometric origin.

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